

Developing Gene and Spectral Signatures for Sjogren's Disease Diagnostics

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Abstract

Sjogren's Disease (SjD) is an autoimmune disorder that leads to hypofunction of the salivary and ocular glands; besides leading to persistent dry eyes and dry mouth, Sjogren's symptoms can include joint pain, skin rashes, and difficulty swallowing. Such symptoms can overlap with those of other autoimmune disorders such as Rheumatoid Arthritis. We want to identify a precise biomarker that can be used as a diagnostic criterion for identifying SjD that uniquely sets it apart from other diagnosed diseases. Currently there is no specific diagnostic for SjD, and several symptoms must be assessed using various methods--which can take several years--to determine whether a patient has Sjogren's Disease. To find a biomarker that can precisely identify Sjogren's in a non-invasive and efficient manner, we are studying both RNA transcripts from salivary gland biopsies and spectral patterns from saliva samples of Sjogren's patients. We are using microarrays to identify messenger RNA (mRNA) and microRNA (miRNA) transcriptomes found in the minor salivary gland biopsies of patients with SjD; through validating specific RNA, we aim to identify signature gene(s) that characterize Sjogren's. We have identified miRNAs and mRNAs that are altered in SjD salivary gland biopsies of human Sjogren's patients. We are also using Raman Spectroscopy combined with machine-learning analysis to identify a spectral signature in human saliva samples that are characteristic of Sjogren's Disease. Using Raman Spectroscopy, combined with machine-learning analysis, we can distinguish SjD spectral patterns clearly from healthy patient controls and patients that have salivary hypofunction after having undergone head and neck cancer radiation therapy. By identifying gene and spectral signatures, we hope to create a "disease fingerprint" that can be used to diagnose Sjogren's disease through non-invasive methods.

